

The Next 100 Years of Flight

Topic Hot List

Introduction: This is a valuable collection of Internet sites for teachers and students who want to explore the future of flight.

Advanced Vehicles

Hyper X – travels 10 times speed of sound, enable commercialization of space using Scramjets (supersonic-combustion ramjets)

<http://www.dfrc.nasa.gov/Projects/hyperx/x43.html>

Blended Wing Body - aircraft shape of the future for commercial aircraft Construct a ring wing glider from the instructions on this NASA Educational Bookmark.

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Support/Technology/Educational.Guides.and.Activities/Blended.Wing.Body.Bookmark/.index.html>

Morphing Aircraft – 21st century aeronautical vehicle, gallery of images

<http://www.dfrc.nasa.gov/gallery/photo/Morph/HTML/ED01-0348-1.html>

Helios – solar powered aircraft with potential to stay aloft for months

http://www.dfrc.nasa.gov/PAO/X-Press/stories/050802/new_helios.txt.html

Links and photos of Helios

<http://spacelink.nasa.gov/NASA.Projects/Aerospace.Technology/Revolutionize.Aviation/Increase.Capacity/Helios.Prototype/>

Next Generation Space Shuttle - The goal is to develop space transportation systems that would be 100 times cheaper and 10,000 times safer than today's launch vehicles. These true spaceliners of the future could take off from aero-space ports that will accommodate both air and space vehicles.

http://www.space.com/missionlaunches/sli_firstphase_020430.html

Hypersonics – Discusses scramjets and the X-43A

<http://www.howstuffworks.com/hypersonic-plane.htm>

Marsplane

Design a Mars Airplane <http://quest.nasa.gov/aero/planetary/index.html>

Intelligent Flight Controller system is used with the Marsplane. **Simulated** flight is at

<http://www.arc.nasa.gov/computing.html>

Image of the Marsplane is at

<http://mars.jpl.nasa.gov/gallery/spacecraft/marsplanescout.html>

Online Marsplane simulation from the NASA CONNECT program Glow with the Flow.

<http://connect.larc.nasa.gov/flow/maxinstructions.html>

Airborne Scientific Research

Advanced unmanned aerial vehicles (UAV) like ERAST have the potential to complement existing platforms for understanding the Earth and atmospheric science.

<http://geo.arc.nasa.gov/ERAST/pathfinder>

NASA DC-8 participates in snow and ice study.

<http://www.dfrc.nasa.gov/PAO/PressReleases/2002/02-08.html>

NASA studies air quality and climate during African Fires.

<http://www.dfrc.nasa.gov/PAO/PressReleases/2000/00-84.html>

APEX - ultrahigh-altitude aircraft for atmospheric sampling and military surveillance

<http://www.dfrc.nasa.gov/Projects/apex/apex.html>

Aviation Safety

The Icing Branch strives to make flight in icing conditions safer through research, education, and partnering with agencies, industry, and academia.

<http://icebox.grc.nasa.gov/>

Crew-Vehicle Systems Research Facility (CVSRF), a unique national research resource, was designed for the study of human factors in aviation safety.

<http://www.simlabs.arc.nasa.gov/cvsrf/cvsrf.html>

Small Aircraft Transportation System (SATS) – travel alternative freeing people and products from transportation system delays, by creating access to more communities in less time. <http://sats.larc.nasa.gov/main.html>

Center-TRACON Automation System, or CTAS, is a set of tools designed to help air traffic controllers manage the increasingly complex air traffic flows at large airports.

<http://www.ctas.arc.nasa.gov/>

Air Traffic Tower systems – FutureFlight Central is a national ATC/ATM test facility dedicated to solving the present and emerging capacity problems of the nation's airports.

<http://ffc.arc.nasa.gov/>

Aerospace Research

Aircraft Design Workshop - Try your hand at the design of a 200 passenger airliner, flying from Washington D.C. to the destination of your choice.

<http://connect.larc.nasa.gov/activities/adw/welcome.html>

Introduction to Flight Test Maneuvers – a glimpse into the science of flight testing.

<http://www.dfrc.nasa.gov/trc/ftintro/index.html>

The F-15 ACTIVE - an aircraft used by NASA to explore the extreme limits of aerospace technology, is featured in this NASA Educational poster.

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Support/Physical.Science/Aeronautics.and.Aerospace/Exploring.the.Extreme/.index.html>

Virtual Laboratory, or VLAB, is a project to develop the technology and methodology for remote access to a research facility employing an interactive, virtual reality interface.

<http://www.simlabs.arc.nasa.gov/vlab/>

Aviation Simulations - Vertical Motion Simulator (VMS) – world's largest full motion simulator for Future Flight Vehicles <http://www.simlabs.arc.nasa.gov/vms/vms.html>

F-15B Research Testbed - long-term capability for the efficient flight test of aerodynamic, instrumentation, propulsion, and other flight research experiments

<http://www.dfrc.nasa.gov/Projects/f15b-ftf/index.html>

The Systems Research Aircraft (SRA) is a dual-purpose facility **benefiting** commercial and military developments. <http://www.dfrc.nasa.gov/Projects/SRA/>

Student Aerospace Design and Research Opportunities

Careers in aeronautics – find out about many engineering and technical jobs used at Dryden Research Center. <http://www.dfrc.nasa.gov/trc/careers/index.html>

FoilSim II includes a stall model for the airfoil and a model of the Martian atmosphere for lift comparisons. <http://www.grc.nasa.gov/WWW/K-12/FoilSim/index.html>

EngineSim is a simulator that models the design and testing of jet engines and the effects of engine type on aircraft speed and range. <http://www.grc.nasa.gov/WWW/K-12/Enginesim/index.htm>

Beginner's Guide to Aerodynamics- Airplane Parts/Functions Problem Sets

http://www.grc.nasa.gov/Other_Groups/K-12/BGA/Dan/airplane_parts_int.htm

Glow with the Flow – NASA CONNECT program looks at drag. Teacher guide complements the video program. http://connect.larc.nasa.gov/pdf/00_2.pdf

Regimes of Flight - learn about flight at different speeds!

<http://quest.nasa.gov/aero/events/regimes/index.html>

Tools of the Trade - This NASA Educational poster features research aircraft and a hands-on activity for building and experimenting with basic wing/tail canard configurations.

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Support/Physical.Science/Aeronautics.and.Aerospace/Tools.of.the.Trade/.index.html>

The ETO Engineering Design Challenges Program connects students in their classrooms with the challenges faced by NASA engineers as they design the next generation of aerospace vehicles. <http://eto.msfc.nasa.gov/>

Aeronautics Educator Guide - The activities in this educator guide are divided into three chapters: Air, Flight, and We Can Fly, You and I. They are designed to be uncomplicated and fun and have been tested in countless classrooms and workshops.

<http://spacelink.nasa.gov/products/Aeronautics/.index.html>

757 Glider Kit - Each glider challenge calls for students to develop abilities to identify and state a problem, design a solution, implement a solution, and evaluate the solution.

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Support/Physical.Science/Aeronautics.and.Aerospace/757.Glider.Kit/.index.html>

How High Is It? - NASA educator guide focused on scale models of distances for grades 5-8 and includes Helios and Blended Wing Body altitudes in understanding scale.

<http://spacelink.nasa.gov/Instructional.Materials/NASA.Educational.Products/How.High.Is.It/How.High.Is.It.Educator.Guide.pdf>

Propulsion Research

Propulsion Flight Test Fixture - airborne engine test facility that allows engineers to glean actual flight data on small experimental engines that would otherwise have to be gathered from traditional wind tunnels, ground test stands or laboratory setups.

<http://www.dfrc.nasa.gov/PAO/PressReleases/2002/02-06.html>

Notes to Teachers and Educators

This is a list of Internet sites, which contain many excellent ideas that will involve, and challenge the student. Research is current, and there are many simulations, graphics, and activities that provide excellent resources for both adults and students. There are sites with detailed lesson plans which teachers will find useful as they develop curriculum for their classroom.

Addressing the Standards

The National Science Education Standards for Grades 7-12

<http://books.nap.edu/html/nses/html/>

Standard B: Physical Science

Standard C: Life Science

Standard E: Science and Technology

The National Council of Teachers of Mathematics Standards for
Grades: 9-12.

<http://standards-e.nctm.org/document/chapter7/meas.htm>

Standard 1: Mathematics as Problem Solving

Standard 3: Mathematics as Reasoning

Standard 4: Mathematical Connections

Standard 6: Functions

Standard 14: Mathematical Structure